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THE
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☞See advertisement on last page.

Poetry.

GENIUS.

Oft does an unshap'd glorious thought
Rise in the ideal blest,
And like a dream forever fade,
Ere it can be expressed ;
Just as the wave upmounted high,
With curled and foamy crest,
Sinks down again in ocean deep,
To its eternal rest !

'Tis in the soul where genius dwells
Those meteor thoughts arise,
Like phosphorent light upon the waves
That roll 'neath sunny skies ;
This part of God ! this unseen Sun !
Mankind too seldom prize,
Yet does it oft-times gild a thought
That never, never dies.

'Tis like a beacon on a hill,
By it our path we find ;
'Tis like a light upon the sea,
Past shoals by it we wind ;
It sheddeth universal light
Throughout the world of mind !
Imperishable ! it remains
" For all time" with mankind.

The Almighty said "Let there be light,"
And o'er the world it shone !
He, to dispel our mental night,
Sent genius from his throne.
'Tis undefinable as space !
(The infinite unknown,)
Through it a revelation of
Almightiness is shown !

THE CROP OF ACORNS.

BY MRS. SIGOURNEY.

There came a man in days of old,
To hire a piece of land for gold,
And urged his suit, in accents meek,
" One crop alone, is all I seek ;
That harvest o'er, my claim I yield,
And to its lord resign the field."

The owner some misgivings felt,
And coldly with the stranger dealt,
But found his last objection fail,
And honied eloquence prevail,
So took the proffer'd price in hand,
And for one *crop* leased out the land.

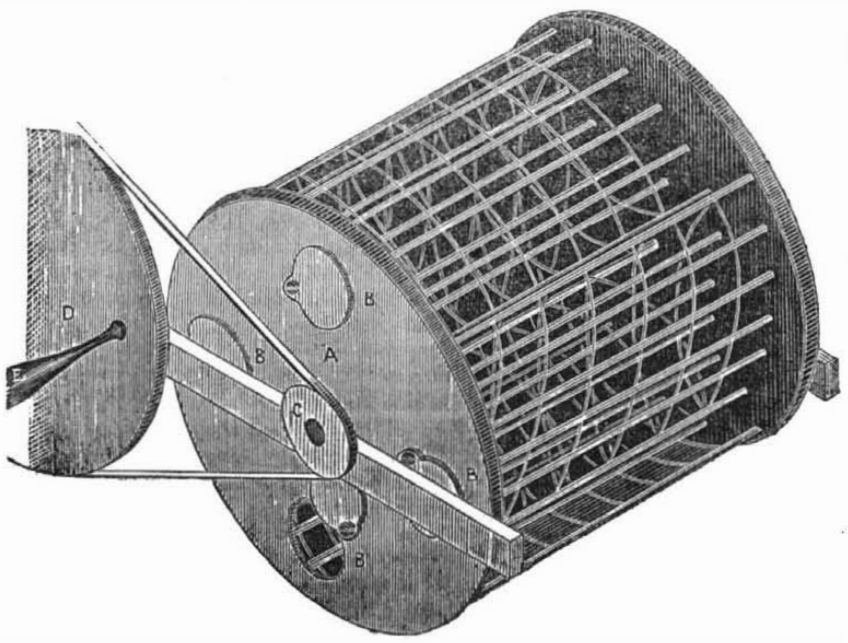
The wily tenant sneer'd with pride,
And sowed the spot with acorns wide;
At first, like tiny shoots they grew,
Then broad and wide their branches threw,
But long before these oaks sublime
Aspiring reach'd their forest prime,
The cheated landlord mouldering lay
Forsaken with his kindred clay.

Oh ye, whose years unfolding fair,
Are fresh with youth and free from care,
Should Vice or Indolence desire,
The garden of your soul to hire,
No parley hold, eject the suit,
Nor let one seed the soil pollute.

My child, their first approach beware,
With firmness break the insidious snare,
Lest as the acorns grew and throve,
Into a sun excluding grove,
Thy sins, a dark o'ershadowing tree,
Shut out the light of heaven from thee.

CHAFFEE'S CLOTH AND WOOL DRIER.

Figure 1.



This is an apparatus for drying wet cloth and wool in a shorter period than is now done by hanging cloth over poles in a warm drying room, or wool upon nets submitted to a great degree of heat. It saves the expense of a drying room in many instances for cloth, and for wool always, and besides, it is a great saving in expence of workmanship as far more can be dried by it, and without carrying the wet wool out of the washing or dye house. It should (and no doubt will) be attached to every cloth factory. The apparatus consists of a large wheel like a *dash wheel* divided into four apartments made of stout rods or wires, and open to the atmosphere around the whole periphery so as to let the cloth or wool in the apartments of the wheel, have free access all around to the same.

FIG. 2.

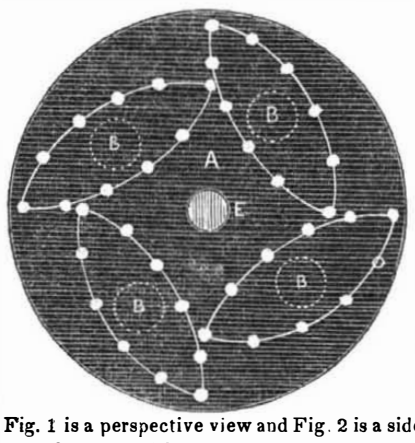


Fig. 1 is a perspective view and Fig. 2 is a side or end section. The wheel A, has two circular sides, in one of which are four openings indicated by B. Each opening is an entrance to one of the chambers in the wheel to put in and take out thereby the cloth or wool. Each opening is provided with a lid and by the lower opening the goods are easiest put in and taken out, hence the cover has been left open for this purpose. C, is a small pulley on the shaft of the wheel, and D is a large pulley to drive C at a great speed, by the band passing over the same. E, is the axle. F, is merely a handle to show that D is the main driver. The rods that divide the wheel into apartments extend across securing the two sides of the wheel together, and forming elliptical apartments in the wheel, as exhibited in fig. 2. The cross rods are stout, and are interlaced with finer wires like cage work. There are narrow passages between each apartment at the outside to let the air pass from the outside into the interior of the wheel around the chambers and by the form of the chambers, it will be perceived, that here we have the cloth or wool in the chambers acting the part of the fans in the blower to expel the moisture from the goods.

OPERATION.—The wet cloth or wool is put into the chambers, the one filled after the other, and the wheel is then set in motion, when, although the chambers are closely filled with goods, they are dried in a very short period, in fact its results have astonished not only the inventor, but every person who has seen it in operation.

The inventor is Mr. Nelson E. Chaffee, of Ellington, Connecticut, who has applied for a patent, and to whom communications, post paid, may be addressed for further information.

Dancing on a Chimney.

The Fife Herald, Scotland, narrates the antics of a steeple and chimney climber on the top of a chimney stalk at Newton of Abbotshall, 136 feet high. He fixed a plank ten inches broad, and projecting about twelve feet on each side, on the top of the chimney. In the centre of this plank he placed a pole sixteen feet high having a small piece of wood on the top, which he climbed up and stood upright on, holding a flag in his hand. After doing so, he descended to the top of the stalk when he walked out to each end of the plank and struck an axe into them. He then turned about towards the centre, and, to the great alarm of the assembled multitude, stood on his head for some time, and, returning to his feet, he stamped firmly upon the plank on each side of the chimney. He then safely descended head-foremost.

Beware of the Saw.

A hoosier, on a visit to Cincinnati, a few days ago, called on business at a planing machine establishment in the Third Ward. The planing department had not yet been started but a small circular saw, which was set nearly at the edge of the bench, and projected a scant inch above its surface, was in full blast. Mr. Green, as the hoosier may be called, looked around, but finding nobody visible, concluded to seat himself on the bench while awaiting somebody's appearance. Neither noticing nor mistrusting anything, he squatted plumb upon the saw—one spring nearly to the ceiling, and a pitch forward to the floor, indicated his astonishment at finding an incision of six inches in the length of his seat. His cries brought assistance. Dr. Eaton closed the flesh wound, and a skilful tailor that in the pantaloons.

RAIL ROAD NEWS.

South Carolina Railroad.

The business of the South Carolina Railroad shows a large increase in favor of 1848. The gain, as will be seen by the annexed statement is nearly all on freight, which has increased 75 per cent. The following receipts are for July, August, September and October :

	1847.	1848.
Passengers,	65,347	68,725
Freight,	117,084	198,062
Mails, &c.,	15,084	14,489
Total,	197,515	281,276

Increase in 1848, (equal to 43 per cent.,)—$83,761.

Nashville Tennessee Railroad.

The lettings on the Nashville and Chattanooga Road are being made at a large saving on the estimates, and the road will cost about $2,000,000, instead of $3,120,000, as estimated. It is believed that the road will be finished without a dollar of debt, excepting the half million of bonds endorsed by the State of Tennessee. The iron of this road is to weigh 88 to 104 tons to the mile, which is 25 per cent heavier than the original estimate.

Mineral Railway Sleepers.

Two Parisians, Messrs. Chevearuse and Bourent have discovered a new mineral compound, of vulcanized india rubber, graphite and some other substances, which is said to be far superior to wood, or even timber laid on felt.

In America, timber sleepers are best yet, and will be for many years to come. In Europe, where timber is dear, we would decide upon the economy of some other cheaper (if as suitable) a material.

Safety of Railroad Travelling.

The Queen, in her late journey from Scotland, travelled over 400 miles by railway, and when it is known that over this distance her Majesty was conveyed, without any previous notice at the rate of 35 miles an hour including stoppages, at a rate amounting to, but not exceeding, at any time, 50 miles an hour, over a country rising twice to an elevation of 1,000 feet above the level of the sea, and descending at intermediate stations nearly to a level of the sea, so conveyed without the slightest cause of alarm—we may be permitted to say that railway travelling has reached an amount of perfection, regularity, and security, unsurpassable and almost unhoped for.

River Sport.

The most popular boats now running on the Ohio are those drawing the least water. It is a favorite amusement with the steamboats now to jump sand bars. This is accomplished by those crafts which are able to run where the sand is a little damp, holding in their steam till they almost reach the bar, when it is let out and a flying leap is taken that would eclipse anything short of the swoop of an eagle in the air. The men passengers cheer and the ladies wave their handkerchiefs, while the travellers on the several boats lying in the neighborhood aground, pull their hats desperately over their eyes, sigh deeply, and liquor.

Natural Gas.

Mr. Samuel Stedman, of Franklin County, (Ky.) after boring for water at his residence, on Elkhorn, to the depth of ninety-seven feet, nearly all the way through solid rock, struck with the augur a vein of natural gas, which forced its way in a large volume to the surface. Fire being applied to it, it burnt as brilliantly as the best manufactured gas. The Frankfort Yeoman says the quantity which escaped from the augur hole is sufficient to light up a city, and that Mr. Stedman has conveyed it to his house where he has the good fortune to possess a cheap and beautiful light, from nature's great laboratory.

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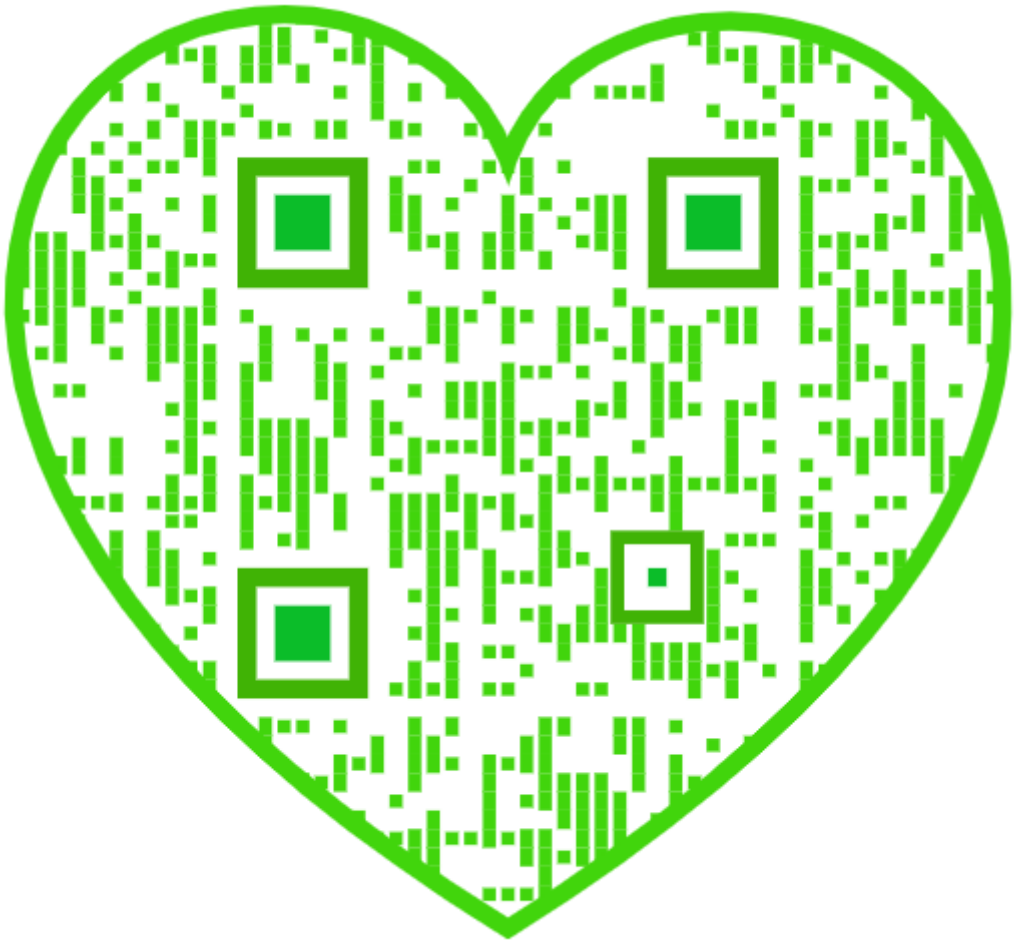

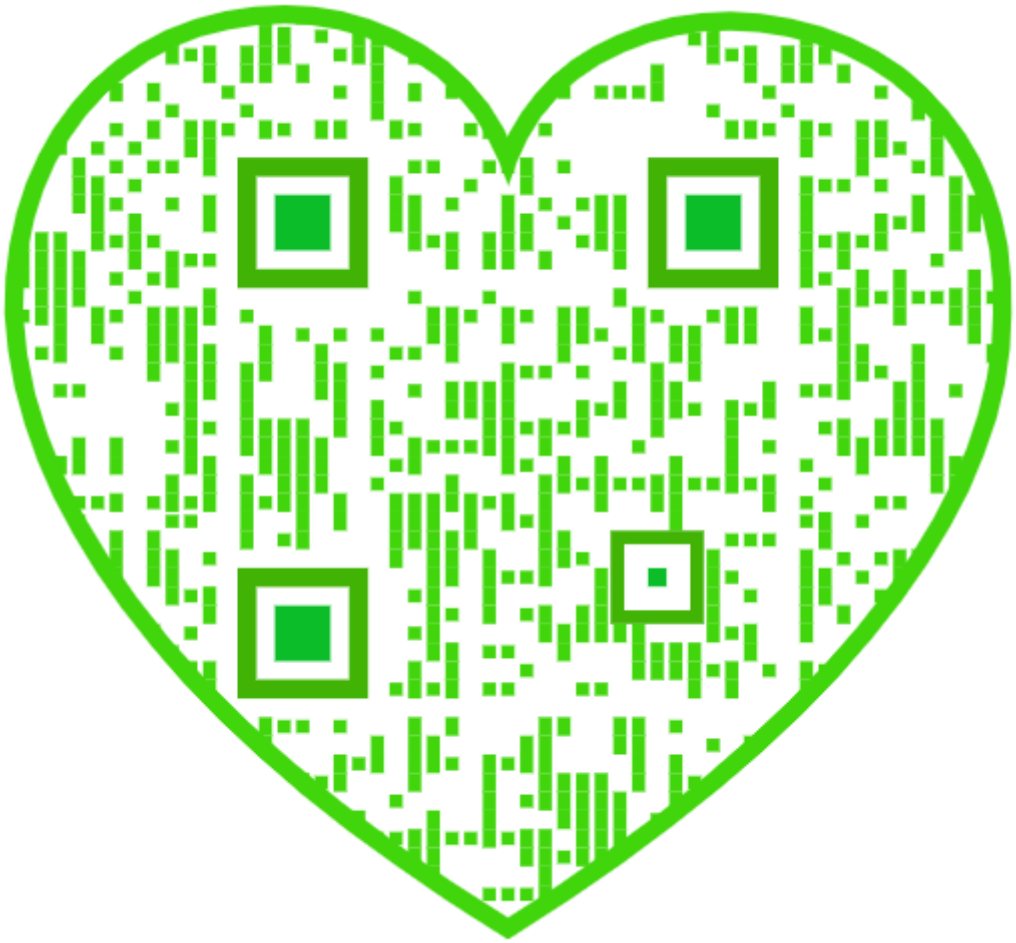

The Fair of the American Institute.

No. 7.

PREMIUMS AWARDED.

SILVER MEDALS.

Reed & Co. 104 Avenue C, for best Stained Glass.

James Weir 240 Mott-st. for beat Ornamental Painting.

Wm. Jeffries, 446 Pearl-st. for Ornamental Painting.

H. S. Farelly, 23 Canal-st. for superior specimens of Scagliola.

A. F. Kinnersley, 64 John-st. for best Wood Engraving.

Sarony & Major, 117 Fulton, for best Lithography.

Call & Foster, Springfield, Mass. for best Night Lock and Latch.

McEwen & Thompson, 54 Goerck-st best Iron-bound Barrels and Casks.

Leonard & Wendt, 29 & 31 Gold-st, 2d best Tailors' Shears & Scissors.

J. B. Ostrander, 81 Pearl-st for best Butchers' Knives.

Bradshaw & Perlee, 5 Platt-st. for Table Knives and Forks.

Ephram Arnold, for a case of Carpenter's and Cooper's Edge Tools.

Coombs & Anderton, 83 Mercer-st. for Silver Plating.

Levi Brown, Brooklyn, N. Y. for 2d best Gold Pens.

Chas. Goodyear, N. Haven, Conn. Portable Indian Rubber Life Boat.

Hayward Rubber Co. Colchester, Conn. best Indian Rubber Shoes.

D. Eggert & Son, 239½ Pearl-st. for Finish on Marine Chronometers.

Marine Clock Co., New Haven, Conn. for Marine Clock.

Benjamin Shaw, 71 Canal-st. for Ladies Boots and Shoes.

D. Mundel, Brooklyn, for best double-soled boots.

G. Hammond, 422 Broadway, for best Light Boots.

Mrs Kendall, 136 Bowery, for best Pamela Bonnets.

Berger & Walter, 39 Maiden-lane for 2d best Plain Cut Glass.

Bennett & Brother, Pittsburgh, Penn. for best Rockingham Ware.

W. Oppitz, 95 Liberty-st. for Glass and Stone engraved ware.

Allcock & Allen, Broadway, for 2d best Candelabras.

Roberts, Eagles & Co. Newark, for best Coach-lamps.

H. S. Woodruff, 24 Cedar-st. for best Trunk.

S. J. Pymm, 256 Third-avenue, for Cart Harness.

Thomas Fitzharris, Brooklyn, for a Ladies Saddle.

S. B. Amory, Goshen, N. Y. for best double barreled Rifle.

Allen & Thurber, 201 Broadway, for best revolving and self-cocking Pistols.

J. W. Leavitt, 261 Water-st. for best compressed Shot and Bullets.

Blunt & Syms, 44 Chatham-st. for best twisted Gun-barrels.

Walter Hunt, N. Y. for self-priming Firelock.

Bourgard & Brothers, 5 Frankfort-st. for best Wigs.

S, Dodd, Bloomfield, N. J. for best Bookbinders' Stamps.

Culver & Co. 52 Beekman-st. for 2d best Hot Air Furnace.

Wm Cory, 52 Cliff-st. for best portable Hot Air Furnace.

John Morrison & Son, Troy, N. Y. for best Hall Stove.

Fisk & Raymond, 209 Water-st, for best Air-tight Stove.

Tuttle & Bailey, 210 Water-st. for best Hot Air Register.

Jordan L. Mott, 264 Water-st. for best Cooking Stove.

Will Saltpetre Explode?

A correspondent of the Hartford Times, relating his experience with saltpetre says: "Our insurance companies, as well as those more directly interested, will be anxious to know whether saltpetre, without being intimately compounded with some inflamable substance, will explode? I have been 25 years in the trade and manufacture of the article into gunpowder, and if my experience is of any use, I have yet to learn that saltpetre will explode without some known agent, and that intimately combined. During the time above mentioned, I have had two buildings burned down in both of which saltpetre was stored; one caught fire by accident, and the other was fired by some evil designed person. In both instances there was no explosion, but the fusion of the saltpetre into a liquid, which ran out at the bottom of the building while burning.

I had a man employed to refine saltpetre. He put into a kettle, under which was a strong fire, two or three bags of saltpetre; he forgot to put water to it till it was very hot, and as he added two or three pails of water, an explosion took place, which broke the kettle, or rather cracked it. Neither myself nor the workmen supposed the saltpetre exploded, but the water; for the saltpetre remained in the kettle and the water had escaped. And I am much inclined to think that the explosion would have occurred had there been no saltpetre in the kettle. It is well known that saltpetre in a state of crystalization usually contains a small quantity of water; therefore for gunpowder it is made fine and dried in kettles over a fire. It never occurred to myself or workmen that there was danger of explosion. If you will call at the shops and enquire for sal prunelle, you will be shown small cakes which are made from melted saltpetre and run into moulds.

Some years since, I shipped a quantity of saltpetre at Newport. The sailor-boys took out some to burn (for they thought, like some of the New Yorkers, that it would explode), and set fire to it: it would not burn, but melted and ran on the deck of the vessel. The captain told the boys to pound it fine and add some pulverized coal to it; and it would burn; they did so, and set fire to it: It burned, but rather slowly. Another agent was wanted to make an explosion.

I have for several years manufactured green glass and occasionally white glass, and always used saltpetre (in connexion with other articles) for a flux. There was no explosion; even the escaping of the flux would continue for 14 hours, or until after the glass became clear and fit to blow."

[This is the right kind of information on the subject—plain and practical—Ed.

Extraordinary Case.

There fell under our observation yesterday, says the Kingston, (Ulster Co.) Journal, the most singular case of disease we ever witnessed. The subject is a man named Snyder, aged 35 years, residing in the town of Wawarring in this county. Four months ago he had an attack of sickness, but recovered and was to all appearance entirely healed. About a fortnight after his recovery he was seized with drowsiness, and for some time after slept nearly two-thirds of the day. This increased until he would sleep two or three days without waking. When we saw him yesterday he was continuing an uninterrupted sleep of 5 days. His pulse is regular though not very full; his respiration is easy and natural, and his skin moist and cool. If food or drink be placed in his mouth he swallows it, and he walks when led by the hand and slightly supported. Tuesday last he awoke from a sleep of two days, spoke a few words, struck a lady who was in the room violently with a chair, and almost immediately afterward sunk into his present slumber. He has been sent to the New York Hospital.

According to Haller, women bear hunger longer than men; according to Plutarch, they can resist the effects of wine better; according to Unger, they grow older and are never bald; according to Pliny, they are *seldom attacked by lions*, (on the contrary they will run after lions) and, according to Gunter, they can *talk a few!*

Anthracite Coal in Onondaga County.

The Syracuse Star mentions the discovery of a bed of Anthracite near the town of Camillus, Onondaga Co.,—in appearance precisely similar to the Pennsylvania production. The land upon which the coal has been discovered is about a mile and a half south of the village in a hilly though fertile section. Col. Bull who is proprietor of the farm, and lives upon it, has long contended that coal existed in the vicinity, and uniformly gave as his reason for such belief that he had frequently found lignite (a mineral substance which always forms the upper strata of coal-beds,) in large quantities on different parts of the farm and other places in the vicinity. The belief he has always maintained notwithstanding the opinions of geologists were against him. A few weeks since, it was resolved to put the Colonel's favorite theory to the test, and the result was, that by digging some six or eight feet, a stratum of lignite was found, and farther to the dept of some fourteen feet, strata of pure Anthracite Coal appeared on all sides. Since that time, coal has been taken from the "mine" in considerable quantities and some pieces, which have been brought to the village of Camillus, will weigh nearly or quite 100 pounds. To all appearance, thus far the coal is as exhaustless as the earth in which it lies embedded, says the Star.

This discovery will prove very valuable to that section of the country—provided every thing is just as stated; all which is yet to be seen.

We have known a valuable coal bed turn out to be black slate. This may yet be the case with the Onandaga coal, but we hope not.

To take Ink out of Linen.

"Take a piece of tallow, melt it, and dip the spotted part of the linen into the melted tallow. It may then be washed and the spots will disappear without injuring the linen."

The above receipt is not correct, and we wish to correct it, because it has had some circulation. The tallow will do no harm but it will do as little good. The best thing to take ink stains out of linen is oxalic acid. A few crystals should be put on the stain, and warm water poured on them—making a little kind of bag in the linen to prevent the crystals being carried off, but to allow them to dissolve on the spot. The acid looks like epsom salts, and is a poison—therefore should be kept out of the reach of children. This acid will also take stains out of furniture, but it will leave a yellow mark in mahogany. From experience, we can state positively that nothing can equal this acid for erasing iron spots from linen with so little injury to the fabric.

How to Cook Salt Cod.

If very dry, it should be soaked for six hours in soft water, then placed upon a brick or stone floor for eight hours, soaked again for six hours longer, and then brushed with a hard brush. Under this treatment the most stubborn fish will swell considerably if boiled gently in soft water; two separate soakings are better than one however continuous, since the alternate expansion aad contraction loos-on the fibres of the fish and occasion it to come off in finer flakes. It is generally served up with parsnips and egg-sauce and may be warmed the next day, separated into flakes and put into a good sauce with chopped eggs at the top, and a wall of mashed potatoes or parsnips all around.

Coat of Arms.

Theodore Parker, in a late sermon, said that the grandfathers of many men, who now-a-days are studying heraldry to get at their patent of nobility, had not even a coat to their arms. Barnum, who has adopted a "coat of arms," with the motto, "love God and be merry," obtained it by a short Yankee cut, which cost him no search into pedigree. While in Paris some time ago, the effects of a deceased Russian Ambassodor, Prince T—, were sold ar auction. Several English and other noblemen were at the sale, but as the gold, silver and porcelain ware bore the arms and initials of the Prince, no one but Barnum would bid for it The consequence was he got a superb bargain. To the initials P. T., signify Prince T—, he added the letter B., adopted the coat of arms, and thus became a nobleman at once.

Wire and Hemp Ropes—Their Comparative Strength.

An experiment was recently tried in England, at the Woolwich Dockyard, to ascertain the comparative strength of wire and hemp ropes. A wire rope, three inches round, and a hemp rope of three strands, hawser laid, common make, seven inches round were spliced together, and placed in the testing machine and on the hydraulic power being applied the hemp rope broke in the middle on the strain reaching 11½ tons—the wire rope remaining apparently as strong as when the experiment commenced. A wire rope, 3½ inches round, was then applied with an eight-inch hemp shroud rope, and on the power being applied, again the hemp rope broke in the middle, with a strain of 10½ tons, the wire rope continuing apparently uninjured.—This is considered a very satisfactory experiment.

Artful Robbers.

The robbers who stole the government jewels at Washington hit upon a successful expedient to avoid being heard. The articles stolen were kept in a double case, the glass of which had been broken to reach them.—For fear of making a noise. the robbers first spread a piece of pink blotting paper with gum arabic, and pasted it to the outer glass; with a knife or piercer the glass was broken by prying it around the edges. The fragments adhered to the paper, and were thus silently removed.

Human Life Estimated by Pulsation.

An ingenious author asserts that the length of a man's life may be estimated by the number of pulsations he has strength to perform. Thus, allowing seventy years for the common age of man, and sixty pulses in a minute for a temperate person, the number of pulsations in his whole life would amount to 2,207,520,000; but if by intemperance he forces his blood in a more rapid motion, so as to give seventy-five pulses in a minute, the number of pulses would be completed in fifty years, consequently his life would be reduced fourteen years.

Gas in Buffalo.

The new Gas Works at Buffalo, N. Y. are now in full and successful operation, and the gas was to have been let into the pipes, ready for lighting on the evening of Wednesday, the 8th inst. The apparatus ready for operation is capable of manufacturing gas sufficient to supply a city of 150,000 inhabitants. To make what will be necessary for daily consumption the present year, will require about 4½ tons of coal in every twenty-four hours. A creditable specimen of Buffalo enterprise and liberality.

Important Decision for Odd Fellows in Britain.

Sheriff Bell, of Glasgow, has given judgment in the long pending case of Aitken against an Odd-fellows' Lodge, which seriously affects the position of all such associations in the eye of the law. The learned sheriff finds that such societies not conformed to statute have not only no legal standing but where they exist, do so in defiance of the law. Sheriffs Alison and Skene concur in the decision. These gentlemen are all eminent for legal abilities.

A New Trade.

A firm in Milwaukie shipped for the New York market one hundred barrels of pulverized bones. This is a new trade, and the preparation of bones for manure in this country will doubtless become a matter of attention before many years.

A Gold Mine is said to have been discovered on the lands of G. S. Allison, in North Haverstraw, Rockland county, N. Y. The ore yields three-fifths gold and two-fifths silver, each ton of ore producing one hundred dollars worth of the pure metals. The mine is about to be worked.

"As well might the farmer have the Venus de Medicis placed in his kitchen for a wife as some of our fashionable women." Indeed, it would be much better to have Lot's wife standing there, for she might answer one useful purpose; she might salt his bacon!

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The Electric Telegraph.

No. 5.

At the conclusion of our last article on this subject, it was stated that "House's printing telegraph was a borrowed invention." This was an incorrect assertion. It should have read, that "House's telegraph was not the first telegraph in operation that printed messages in Roman characters." The way in which House's Telegraph and the one we are now about to describe accomplishes the printing of messages, is very different, different in arrangement and different in principle. But this we shall render more plain when we have described this telegraph, by then pointing out the difference.

The description of this telegraph is taken from the Polytechnic Journal, vol. 5, page 167. London, 1841. The inventor is Mr. Alexander Bain, who is now in this country and regarding whose invention of the Chemical Telegraph having been refused a patent has led to a controversy of such a character, that it is to be regretted for the sake of all persons interested. We cannot give the whole article from the Polytechnic Journal, as it is too long for our columns, but we have copied the main description.

On the right hand side of the diagram some machinery is represented in a frame, the whole supported on a common stool. By attentively examining its various parts it will be seen that there are three principal portions, viz. a cylinder A, an ordinary clock wheel B, and a roller C. These three things rotate in the same way: the perpendicular axis of each is parallel with that of its neighbor, and the motion of all is consequently horizontal. Besides the principal divisions, there are other arrangements, apparently subordinate, but really important. It will be noted that the large cylinder goes round upon a spiral screw, the effect of which is gradually to elevate it during the rotation. From underneath this cylinder an arm projects, having connexion with a weight and pulley, so that, as the cylinder rises, the arm rises too, in consequence of the attached weight; upon this arm the roller is fixed; and an ascending motion on its parts, simultaneous with that of the cylinder, and corresponding exactly with it, is the result of the arrangement. The wheel between the two, B, is permanently fixed upon its axis.—These parts, we repeat, are indicated in the following manner: A is the cylinder; B the wheel; and C the roller.

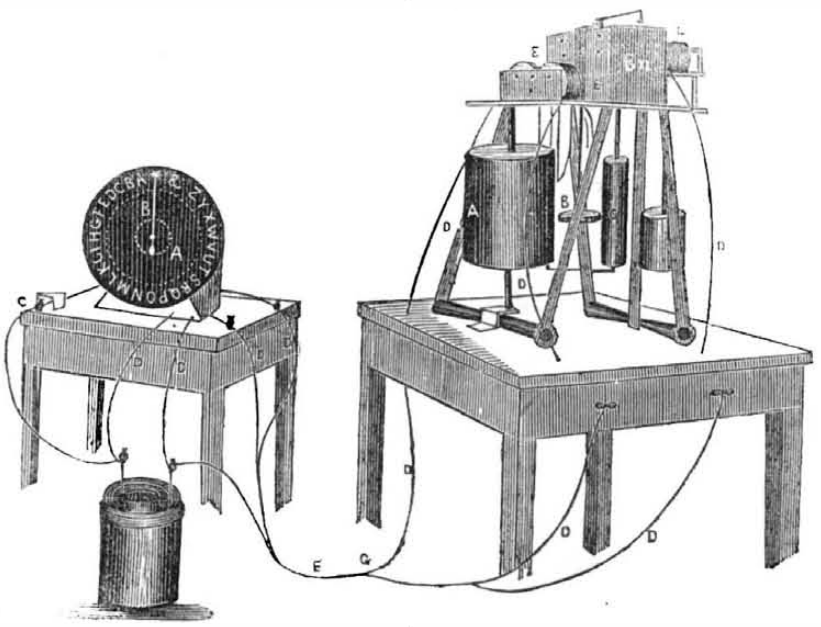
The uses to which these separate parts are applied must first be described. The cylinder which is removable at pleasure, carries the paper (round it) on which the letters are to be printed; the paper being, with equal facility, put upon or taken from it. The wheel between it and the roller, contains upon its periphery, or edge, the letters of the alphabet, regularly arranged, including a full stop. The roller is charged with ink. Due note must be taken that the letters on the edge of the wheel, are made continually to press upon the inking roller whenever the former is in motion, by which means every letter is kept charged with ink, and ready to stamp its impression upon the paper on the cylinder; and it must further be observed, that only one letter can be printed at a time, in consequence of the roller-like shape of the parts. The spiral screw, on which the cylinder travels, secures the gradual elevation of the latter as it rotates, the object of which is to prevent the same surface of paper from being twice presented to the printing letters. In like manner, the ink is never taken by the letters twice from the same place on the roller, because for the reason already assigned, the gradual ascent of the roller corresponds exactly with that of the cylinder. In the nicety of these details we discover evidence of the acute observation of the inventor. They may appear to be of minor importance, in the estimation of those who are dazzled with the primary merit of successfully applying voltaic electricity as a motive power, but the practical writer will at once recognise an admirable attention to working results, without which, however brilliant may have been the original conception, it would want the attributes of an harmonious and therefore useful whole.

Before further description is given let it be borne in mind, that the paper to be printed on is placed round the cylinder, and that the roller is charged with ink. The *lettered* wheel, working between the two, first receives ink from the roller, and is then ready to print upon the paper any letter that is turned towards it. The mechanical action, by means of which the wheel is first made to rotate until it presents to the surface of the paper the letter actually required, and afterwards to strike the paper, in order to produce an impression- which mechanical action is governed, or rather caused, by the electric current, remains yet to be accounted for; but we will first describe the other part of the invention, namely a dial plate or disk (represented on the left hand side of the diagram), an acquaintance with which will facilitate comprehension of what is to follow.

It will be observed that this dial-plate (also placed upon a stool) has a revolving hand B, and that the letters of the alphabet, with a full stop, are described in a circle upon it. This hand goes round by clock work continually in action. An *ivory* peg (a non conductor) arrests the progress of the hand, when required, by being placed in a hole in the plate between the first and last letters of the alphabet, the exact situation of which is indicated in the diagram. A shallow aperture for the point of the same peg is made on the plate underneath every one of the letters. If the person working the machine wants to make the hands stop at any particular letter, all he has to do is to place the point of the peg upon the corresponding aperture, in the plate underneath that letter, and the hand is stopped; but the only place in which the peg can be introduced as a temporary fixture is the one we have mentioned. The object of this arrangement is to obtain regularity. *En passent*, we beg particular attention to the these facts, because the movements of the wheel charged with the letters, in the printing part of the machine, depend upon the rotation of the hand on the dial plates, the explanation of which will be given presently. Underneath the stool which supports the dial plate, a galvanic battery G is placed, which is of course, the source of the electricity employed. To this battery, are attached three wires D, which are first brought into metallic connexion with the hand of the dial plate, and afterwards conducted (E & G) to various parts of the printing machinery. Two of those wires communicate, with two electro magnets E, by the action of which the required effects are produced; and the other is the return wire, the introduction of which is necessary, in order to complete the galvanic circuit. One of these electro magnets, controls the operation of the letter wheel, and the other gives motion to the cylinder.

Particular attention is requested to the small circle of dots A on the dial plate. This circle is composed of pegs of ivory, inlaid upon the dial-plate, the number corresponding with the letters on the outer circle. From the revolving hand projects a small metal pin, the point of which travels over the circle alluded to, as the hand goes round. Ivory is a non-conductor. While the pin is passing over an ivory peg, the electrical fluid ceases to flow from the dial plate to the other part of the machinery, because the interposition of the non-conductor breaks the current; but the moment the pin has passed from the ivory to the metal plate, the connexion is again restored, and the current flows to the electro magnet as before. It is this alternate making and breaking the current which is the cause of mechanical motion by the agency of the electro magnets acting upon springs and wheels.

Let us suppose the letter O is required to be printed by the telegraph. The peg which confines the hand at the full stop of the Dial Plate is removed, and the hand then goes round. Its first movement is from A to B. In this passage the peg we have just mentioned first establishes a current of electricity between the dial plate, and the two electro magnets, in the printing part of the machiney, and then breaks it immediately afterwards by passing on the ivory. Let us now trace the action of this pulsation of the electrical current. Rushing along the conducting wires, it arms both the artificial magnets with the power of attraction for a fraction of a second of time. During this period one of them is brought into play upon the cylinder, which is compelled to rotate a given distance in consequence. The other acts upon the letter wheel, which (by a simple but most ingenious mechanical arrangement, contained in an inclosed box, to be recognized in the diagram as having thereon the letters B*n*.) is made to rotate the exact distance between the letters A and B upon its edge, the latter letter, by the operation, taking the previous position of the former. A similar movement occurs with every subsequent letter until O is reached; that is to say, that as the hand of the dial plate passes over the intervening letters, a current of electricity is established and broken with each, the effect of which is to make the letter wheel advance a letter each time, this is done so that when the hand of the dial plate is at O, the same letter is presented by the wheel to the surface of the paper in readiness to give an impression. In a word, by this arrangement the letters on the wheel in the printing part of this machinery invariably correspond with those on the dial plate. At whatever letter on the dial plate the hand is arrested, the same letter is presented by the wheel to the surface of the paper, in readiness to be printed. This last operation is instantaniously effected. The moment the letter is in its proper place, a connexion is established (by pressing down a metal spring C on the frame work of the dial plate) between the battery and the magnet which works the wheel, which latter is placed against the paper on which it leaves the impression of the letter. In this way letters are first formed into words, and words into sentences.



Mr. Bain the sole inventor and originator of this very remarkable machine—a machine as simple as it is ingenious—has given the result of his genius to the world without any hope of corresponding remuneration, indeed, of any remuneration at all, from ordinary sources. He has secured nothing by patent; and the consequence is that every manufacturer of philosophical instruments may make, and every company may adopt his printing telegraph, without the necessity of paying to the inventor any compensation whatever for so doing."

Artificial Mode of increasing the quantity of Cream.

A Mr. Bekært, of Brussels, Belgium, has discovered a mode, as he says, in which the quantity of cream, on a given quantity of milk, may be increased over and above what would be upon it in the natural way.

His process is thus described. To every two quarts of new milk, a tablespoonful of a liquid, made by dissolving in a quart of water one ounce of carbonate of soda, one teaspoonful of a solution of curcuma or tumeric, and three drops of marigold water. The addition of the solution of soda, he states, causes a larger quantity of cream to rise to the surface of the milk than is procured in the ordinary process. The other ingredients are for the purpose of improving the color and quality of the butter made from the cream."

Mr. Bekært's cream is an imposition upon the public, and his turmeric is for dyeing the imposition in the wool—the only ingenious plan about it. All that the soda can do, is simply, according to its alkaline nature, unite with the oily particles of the milk and form a soapy cream—a very different thing from real.

Mr. Bekært also states that he has discovered the following process, by which he can preserve milk for a great length of time. It is done in this way—place a quantity of new milk, say a quart for instance, into a quart bottle, leaving only a space for the following addition, to wit—"a tablespoontul of the solution of soda, made as above directed, (one ounce of carbonate of soda to a quart of water.) The bottle is then corked, and a piece of string put round the cork to prevents its flying. He then places the bottle so filled in a boiler containing cold water, which is gradually brought up to the boiling point. The vessels are then withdrawn from the fire, and the boiler and bottle allowed to cool together."

The very same object can be accomplished by carbonic acid gas, being infused through the milk and the bottle then stopped.—Ed.

The Lower Classes.

Who are they? The toiling millions, the laboring man and woman, the farmer the mechanic, the artizan, the inventor, the producer? Far from it. These are nature's nobility. God's favorites—the salt of the earth. No matter whether they are high or low in station, rich or poor in pelf, conspicuous or humble in position, they are surely the "upper circles" in the order of nature whatever the fictitious distinctions of society, fashionable or unfashionable, decree. It is not low—it is the highest duty, privilege and pleasure for the great man and the whole-souled woman to earn what they possess, to work their own way through life, to be the architects of their own fortunes. Some may rank the classes we have alluded to as only relatively low, and in fact the middling classes. We insist they are absolutely the very highest. If there is a class of human beings on earth who may properly be denominated low, it is those who spend without earning, who consume without producing, who dissipate on the earnings of their fathers or relatives without being anything in and of themselves.

Wives of the Ancients.

The Grecians had a custom that when the new married wife was brought home to her husband's house they burnt the axletree of the wagon before the doors to show that she must dwell there and not depart thence; and the Romans had a custom that when the bride came to the entry of her husband's house, the bridegroom took her by the wings of her crown and lifted her so high that she struek her head and the door-post together, and so set her within the doors to teach her by the remembrance of that blow not to go often forth out of her husband's house: and the Egyptians did give no shoes unto their wives but suffered them to go barefoot, because they should abide at home; hence it is that a woman is compared to a snail, that never goes abroad but with her house upon her head; when the husband provides things necessary abroad she must be careful to order them at home—not to be gadding abroad, but to keep at home, her greatest virtue being not to be known of any but her husband.

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New Inventions.

New System of Steam Engines.

At a meeting of the Academy of Science, Paris, held on the ninth of last month (Oct.) a new system of steam engines was submitted by M. Boutigny who asserted, from numerous experiments, the existence (before unknown says the Paris papers,) of a fourth physical state of bodies, different from the solid, liquid and gaseous, and to which he attaches the epithet spheroidal. He attempts to explain, by means of the spheroidal state which water assumes in over-heated boilers, "those fulminating explosions of which the occult unknown causes frustrates all the precautions taken to prevent those formidable phenomena" He conceived that water, in the spheroidal state, could be employed at once as a precious auxiliary on board steam-vessels, and that, by its agency in this way, the power of machines might be doubled momently, and this without any change in the present forms of the engines. He thinks he has invented a new and precious *moteur*, and he averts all danger of explosion. A skilful engineer has constructed for him, on the principle of his discovery, an engine of one horse-power, of which the size of the boiler is not larger than may be easily put in the pocket; two other engines, one of two horse-power, and the other of four, are being built in Paris; a third, of four hundred horse-power, is about to be constructed in England. The quantity of coal used in a given time for a given purpose will be less than in the old engines; the new will occupy less space in vessels—leaving more for passengers and merchandise; and they may be adapted perfectly to vehicles running on ordinary roads. Boutigny adds, that the experiments with the engines so far, are entirely satisfactory and conclusive."

Tho above extract exhibits the distance in which the French engineers are behind the American and English. This *new* discovery of M. Boutigny, is old and well known to our engineers and was first discovered by Perkins, an account of which will be found in his experiments with steam.

Fountain Marking Brush.

We have been shown a very pretty invention in the article of Marking Brushes, and take pleasure in recommending them to our friends. The ink is poured into the interior of the handle which is of a hollow japan substance, and the brush supplied by the pressure of a spring at the top. It is a very useful invention and we learn that the inventor is making large sales of the invention. S. B. Whitney is sole agent, corner Broadway and Pine st., up stairs.

Improved Wagon Box.

Mr. Start, of Smyrna, Del., has constructed a wagon with its box resting upon rollers, to be operated by a lever, so that the box may, by a lever and roller like a capstan, be thrown out, or brought upon the cart with the load therein. This will be valuable for heavy loads but for no other purpose.

Deafness.

James Yearsley, an English surgeon, has discovered, according to the Medical Examiner, a curious and efficient mode of relief for deafness resulting from scarlet fever, &c., in cases where the drum of the ear has been broken. It is simply to moisten a small pellet of raw cotton and gently push it down the passage of the ear till it reaches the drum at the bottom; adjusting it till it produces the best hearing. This adjusting is necessary, else it may make the deafness at first only greater. Moisture is indispensable. The cotton should be changed every morning. Many cases are cited in proof of the utility of this discovery.

MORSE AND MANSFIELD'S IMPROVEMENT IN CARS FOR TURNING CURVES.

In No. 8 of this vol. we presented an engraving of this invention, and in an appended note on another page of the same number we referred to the angles of the wheels being wrongly represented in the engraving. As it is an important invention, in case that a wrong impression regarding its mode of operation should be imbibed, we present this week another engraving showing the trucks as attached to the frame of a car, and the position of the axles, wheels and truck when turning curves. It will here be observed in the outset, that the car acts as a guiding lever to make the axles and wheels conform to the curvature of the road.

Fig. 1.

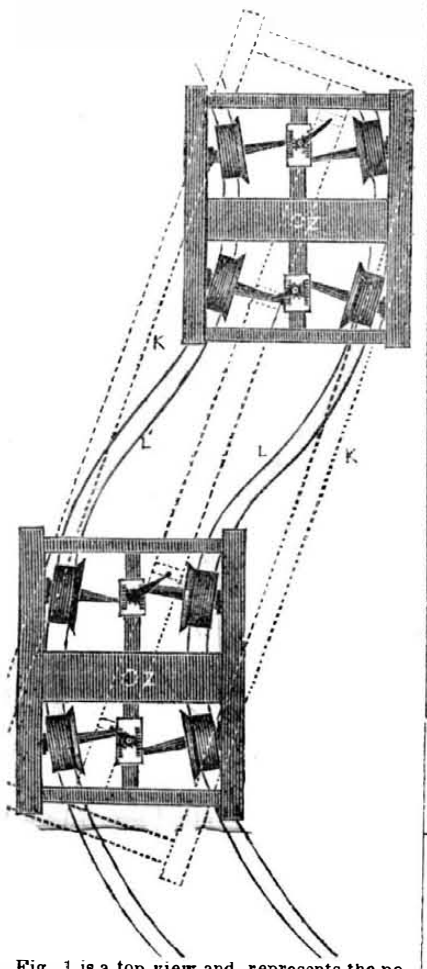
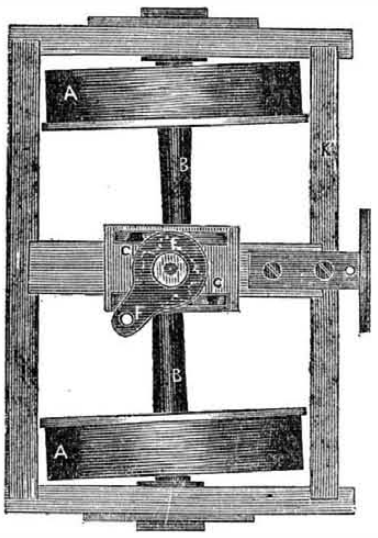


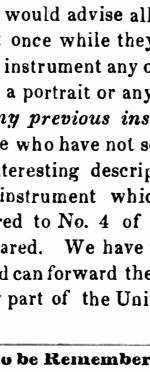
Fig. 1 is a top view and represents the position of the wheels, axles and body of the car passing over a double curvature. L L, are the rails and K K, the body of the car.—Fig. 2 is an enlarged view of two wheels and axles and the axle boxes with part of the car frame. A A, are the wheels. B B, are the axles. Z Z, are the central pivots of the car body. Each wheel has a single axle for itself, and it has this advantage over other cars, that if one axle breaks or one wheel, there is

Fig. 2.



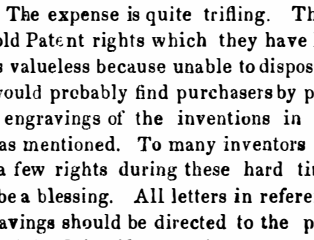
no danger of the car breaking down—the car will run steady upon three wheels to a truck. The inner ends of the axles are hung in suspension oscillating boxes, having cogs on the upper parts. Fig. 3 represents an oscillating box. D, is an inside shoulder, and C, are the cogs on the upper part. These boxes are attached by pivots to the central longitudinal beam of the car, and are retained in square plates firmly secured to the central beam. E, is a plate, on the under side of which are teeth to mesh into C, the open part of the axle bearing like pinion and rack coupling, and F is a crank with a bolt or wrist on the end of it, to fit into a slot in the bottom of the car body K K. To allow the wheels to change with the angle of the axle as seen in fig.

Fig. 3.



1, the outside journals of the axles are fixed in their boxes in such a manner that both the shoulders and journals move in their boxes and work very nicely, as represented in fig. 4. B is the axle. H, the axle block, which from the dimensions of the box, allows the axle at

Fig. 4.



the outer end to move in unison with the other end of the axle in its oscilating bearings. The two crank plates on each truck which have wrists projecting into recesses of the bottom of the bar, are of unequal lengths as seen in figure 1, so that the front and hind wheels will describe different angles, the whole conforming to the curvature of the road. A mathematical problem is involved in the combined motion of the car body and wheels, which cannot be rendered plain in this description, but its operation in fig. 1, is correctly represented.

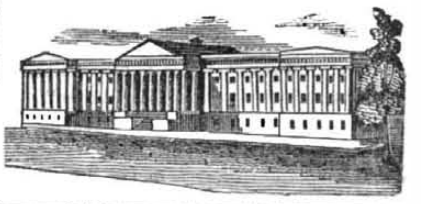
The ingenious inventors are Mr. Jedediah Morse and William Mansfield, both practical men, the former of Sharon, and the latter of Canton, Norfolk Co, Massachusetts.

The Camera Lucida.

The engraving and description of this excellent instrument which we published a short time since, brought us in such a flood of orders that though we had prepared ourselves with a large number beforehand, our supply was quickly exhausted and many were unable to obtain them. We immediately made arrangements for another large quantity and would inform those whose orders have been waiting that their Camera's were all forwarded last week. We have now a few on hand for disposal and would advise all who desire them to send at once while they can be had. By the aid of this instrument any one can draw out a landscape, a portrait or any desired object, *without any previous instruction or practice*. Those who have not seen or do not remember the interesting description and engraving of this instrument which we published, are referred to No. 4 of this volume, in which it appeared. We have them put up in neat boxes and can forward them with perfect safety to any part of the United States.—Price $6.

Facts to be Remembered.

The best way to sell Patent rights or bring an invention into notice, is to have an engraving and description of the same published in the *Scientific American*, as this paper circulates through every state in the union, among those classes most interested in inventions. The expense is quite trifling. Those who hold Patent rights which they have laid aside as valueless because unable to dispose of them would probably find purchasers by publishing engravings of the inventions in our paper, as mentioned. To many inventors the sale of a few rights during these hard times would be a blessing. All letters in reference to engravings should be directed to the publishers of the Scientific American, post paid.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending Nov. 14, 1848.

To Ellis & B. S. Buckley, of Roxbury, Mass., for improvement in Screw Jacks.—Patented Nov 14, 1848.

To William Oldroyd, of Mount Vernon, Ohio, for improvement in Odometers. Patented Nov. 14, 1848.

To William A. Comstock, of Providence, R. I., improvements in the manufacture of Buckwheat Size. Patented Nov. 14, 1848.

To William Beal, jr. of Lowell, Mass., for improvement in Mills for breaking and grinding. Patented Nov. 14, 1848.

To Francis X. Wurm, of Vienna, Austria, for improvement in Furnaces for Steam Boilers. Patented Nov. 14, 1848.

To C. B. Turner, of Buffalo, N. Y., for improvement in operating Brakes for Railroad Cars. Patented Nov. 14, 1848.

To Thomas D. Paine, of Smithfield, R. I., for improvement in Rotary Valve Wind Musical Instruments. Patented Nov. 14, 1848.

To Almond D. Fisk, of New York City, for improvement in Coffins. Patented Nov. 14, 1848.

To John Schley, of Columbus, Ga., for for improvement in Roller Cotton Gins. Patented Nov. 14, 1848.

To Iram Brewster, of Stamford, N. Y. for improvement in Hill Side Ploughs. Patented Nov. 14, 1848.

To Welcome Whitaker, of Troy, N. Y. for improvement in Machines for Plaiting Shirts. Patented Nov. 14, 1848.

To James D. Page, of New York City, for improvement in Book Safes. Patented Nov. 14, 1848.

To Francis S. Pease, of Buffalo, N. Y. for improvement in Harvesting Machines. Patented Nov. 14, 1848.

To A. & H. Johnson, of New York City, for improvement in Filter Stop Cocks. Patented Nov. 14, 1848.

INVENTOR'S CLAIMS.

Artificial Flowers.

To Caroline C. Nichols, of Providence, R. I., for improvement in the manufacture of artificial flowers. Patented Oct. 17, 1848. What I claim as my invention is the afore described improved manner of manufacturing an artifical flower or the corolla thereof, viz: the making the same of helix of floss silk, combined together and with circular bases or pieces, of cloth or pasteboard, substantially as above described.

Window Curtains.

George H. Marden, Charlestown, Mass., for improvement in window curtain suspension. Patented Oct. 17, 1848. What I claim as my invention and desire to secure by letters patent, is the metallic oscillating blocks A B, A B, in the accompanying drawings, not confining myself to any particular shape of the said blocks, but for the purpose as set forth in the specificaiion.

Moulding Glass.

New England Glass Co:, Ass'e. of Jos. Magoun, Cambridge, Mass., for improvement in moulding glass. Patented Oct. 24th, 1848. What he claims is one or more lateral, moveable or retractive parts or pistons as combined with the remainder of the matrix, or stationary part of the mould and made to operate therewith as specified.

Ship's Light.

Enoch Hidden, New York City, for improved ship's light. Patented Oct 24th, 1848. What he claims is securing caoutchouc by baking and compression in the creased grove of the casing to form an elastic seat for the glass frame to be shut down and compressed upon to make a water tight joint.

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NEW YORK, NOVEMBER 25, 1848.

The Culture of Silk.

The United States is capable of raising silk as well as any other country whatever, especially Central Florida. We know one instance in which it was tried in Florida and was a failure, but we believe the fault was not in the climate nor country, but for want of a proper knowledge in the management of the business. There is a great quantity of silk raised at present in the United States, and we know that much is lost for want of proper knowledge in the treatment of the cocoons in destroying the chrysalides for reeling. The common method is to heat them in an oven and submit them to a process of baking, which is a very particular and nice operation. If the degree of heat in the oven is too great, the texture of the silk is destroyed, by the gum becoming softened and the threads made to stick together so that it is impossible to reel the silk from the cocoons. This mode of destroying the chrysalides has been fatal to the reeling of hundreds of bushels of cocoons raised in our country, and on the other hand if too little heat has been used, the evil is as great, for the chrysalides will not then be destroyed. In Italy, the common way is to gather up the cocoons as rapidly and carefully as possible, and suffocate the chrysalides by exposing the cocoons to the burning rays of the sun. This is a better plan than baking them in an oven. Steaming the cocoons to destroy the chrysalides has also been employed with very limited success certainly. It is a bad plan. We believe that there is another plan of destroying the chrysalides which has never been tried in this country to our knowledge, and which is known to but a very few people, but in our opinion is the best ever proposed. It is simply to submit the cocoons for reeling to carbonic acid gas in a close box. It will destroy the chrysalides, without affecting the gum of the silk, and therefore there will be no sticking of threads of the cocoons, as is now so often the case with those baked in ovens. We hope this hint will not be lost upon our people. By late accounts from Bermuda, we learn that the Governor of that Island is about to send to Milan for some families conversant with the silk manufacture ; it being ascertained that the climate of Bermuda is well adapted to the silk worm and the culture of the multicaulis. It is said to be very difficult, if not impossible, to distinguish the Bermuda silk from the Milan. One gentleman at Bermuda, Mr. Vaughn, has a silk manufactory on the island, and this year raised multicaulis sufficient to have fed 1,000,000 silk worms.

This is a wise step and ought to excite some emulation among our Yankee friends. Our people have been led to regard the cotton and woolen manufacture as the only kinds worthy of extensive encouragement and protection.—We go for the encouragement of the silk manufacture likewise. Thousands upon thousands are expended every year upon foreign silks, and for want of proper attention to the raising of the silk worm, our farmers' daughters are indebted for their Sunday frocks to the silk cultivators of Italy, and the weavers of France, whereas they might shine in satin of their own manufacture, rivalling in richness that of the gaudiest belles of Broadway.

International Postage.

There has arisen no system so derogatory to modern civilization, as the reprisal postage arrangements which have been carried on during the last six months between the American and British Governments. It is sometimes amusing to see two stout burly boys snuffing the air and shaking their fists at one another, but it is foolishness itself to behold two grown up men—men esteemed for sense and wisdom, standing each at his own door like a frowning catamount spitting and snarling at one another.

We intend the comparison we have instituted, as a compliment to our own government and uncle John's, as they have caused us some trouble and expense and many of our subscribers likewise. We are glad to perceive however, that the two governments after blowing their noses at one another, have concluded to shake hands and strike an even bargain. It is rumoured that an equal postage arrangement for both countries is about to be consummated. Twenty-five cents here will carry a letter to any part of Britain. This is all very good, but what about newspapers? At present we have to pay 4 cents for every foreign exchange, and our subscribers in Canada, New Brunswick and Nova Scotia have to pay two cents U. S. postage on the Scientific American. We would have a far larger list of subscribers in Canada and the other British Provinces, than we now have, if the postage was less; and more Provincial papers would be taken in the States upon the same principle. And why should we not have a cheaper and a more equal international pastage? We can see no reason why we should not Cheap postage is a benefit to both people and governments, and it is surely neither wisdom nor policy in us nor our neighbors across the Atlantic and St. Lawrence to fetter the press in the Post Office. Upon a great number of international questions, there are wide differences of opinion, but we believe that upon the question of a *cheap postage* the hearts of the people of both countries, are like that of one man. The postage price of letters and newspapers, should be put down to the lowest point, the cheaper the postage the larger the mails and the greater the revenue. This is no vain theory, it is a sturdy demonstrated fact, and while we cannot but admire the legislation that reduces a nation's postage to the lowest point as a matter of policy and profit, it is certainly an anomaly to behold the same nation keep a high *international* postage for the same object. It affords a very correct explanation of that passage in the book of Job—

"Great men are not always wise."

Securing Patents.

We have on our table several letters from persons in the far West who are desirous to know whether or not we are accustomed to secure Patents for Inventors. One says: "I presume you act for Inventors in drawing up their Patent papers, and if so I should prefer you, above all others to do my business. Your intimate acquaintance with all the inventions and inventors throughout the country and your long experience in mechanical matters of all kinds, *must* give you a knowledge which few if any others *in America* possess." We would inform our correspondents and all others who are not already aware of the fact, that we *do* act for inventors in securing their Patents. We have greater facilities for attending to Patent Office matters than any other concern in the United States. But notwithstanding the great number of Patents we are constantly securing it must not be supposed that we hurry or slight them. Every invention receives in our hands, the utmost attention, and not until we are perfectly satisfied that *every thing* is right do we allow it to go from us. The slightest error in the preparation of the papers, such as the wrong insertion of a *single word*, is often sufficient to blast an invention. We repeat our caution to inventors: Be careful whom you employ to secure your Patents. Few know how to do it properly.

Patent Cases.

At the U. S. District Court held in Philadelphia, before Judge Kane, a trial for the infringement of Blanchard's Gun Stock Machine Patent vs Brown and others, was ended, we believe on last Saturday week, by the Jury being dismissed because they could not agree. This is to be regretted as the trial was both a tedious and expensive one to both parties.—We were informed that the Judge charged the Jury in reference to some articles published in the Scientific American. We know that inventors now look to the Scientific American as a source from whence to derive correct information, but we must in justice to Mr. Eldridge, of Philadelphia, state that the articles referred to on pages 30 and 38 this vol., by the Judge, were in our possession (before we could publish them) at least six weeks before the trial commenced. Had we known that the trial was so near at hand, we would not have published them until it was over.—We wish to be impartial, and we wish to see the true inventor protected. We will be glad to publish the views of Mr. Blanchard's friends and we really wish that we could publish the evidence adduced at the late trial. We have been informed that Mr. A. Woolworth, of Hartford, Conn. was there and gave evidence, but it was proved "that he did not employ the rotary cutter wheel until after Mr. Blanchard had applied it, and produced a different combination thereby." Whether the articles referred to influenced or divided the Jury or not, we cannot tell. What were Mr. Eldridge's motives in publishing them is not for us to divine.

There are quite a number of Patent lawsuits going on at present which we shall notice in due season.

The Principle of the Remington Bridge.

In our last number we gave an account of the heroic sufferings of an American inventor in England, regarding whose bridge some inquiries have since been made of us. The principle has been explained and published in some of our exchanges, as follows: The stringers on which the carriage way rests are laid down upon the principle "that a slender prismatic beam though requiring great force to tear it longitudinally, would, nevertheless, easily give way to a transverse force very much smaller. If suspended by its extremities and the force made to act at the centre, the rod would snap in the centre ; but if one of the points of suspension were shifted, then it would snap near the other extremity. This circumstance is applied to the purpose of a permanent carriage way by the position of the scantlings or fulcra, on which the stringers rest, and the operation of which is to remove the tendency of the bridge to break in the centre, and throw that liability in the thicker portions, near the abutments, which are fully able to resist the strain. The stringers are constructed of any length by the process of scarfing. Now a beam in a horizontal position, fixed at one end and pressed down at the other, is liable to break off near the fixed end. Here, by the scarfing of the stringers, the central scarf unites the two portions, into which each stringer may be supposed to be divided, and resists at a long leverage its tendency to separate the fulcrum. A bridge on these principles was first constructed at the Surrey Gardens, and a large one subsequently on the estate of Earl Talbot, in Staffordshire.

This latter structure has a span of one hundred and fifty feet, and is capable of supporting enormous weights ; yet the six stringers or beams which support the planks forming the floor of the bridge are but five inches square at each end, and gradually diminish in size, until at the centre they are only two and a quarter inches, their length being, as already intimated, one hundred and fifty feet. The stringers are formed of pieces of oak timber, each about twenty or twenty-five feet long, attached together by scarfing. The abutments consist of oak posts, six inches square, and fifteen feet long, and five feet in the ground, projecting outward at a considerable angle, and firmly clamped together with iron."

If this is the principle upon which Mr. Remington's Bridge is constructed, it is one long known and practiced in the United States, and although in some respects it may be novel in England, still it would attract no attention in Yankee land.—Ed.

To Inventors.

All who wish to interest capitalists or to find some one who will join them in bringing out their inventions, should have engravings of the same published in the Scientific American without delay. By the outlay of a small sum in this manner nothing is lost. Results of great importance are thus frequently obtained

New Mexican Wool.

A large trade in wool is expected to be carried on between Corpus Christi and New Orleans. The wool is brought to the former place principally by Mexican traders from the neighborhood of Laredo, where there are large numbers of sheep, and wool growing business, pretty generally followed.

Bread made from Horse Chesnuts.

It is well known that horse chesnuts have much nutritive matter contained in them, but they contain a bitter oil which has prevented them hitherto from being used as an article of food. Recently however, a discovery has been made by Mr. Charles Flandin a Frenchman and described in the Paris National of the 18th Oct., by which in a very simple manner horse chesnuts can be converted into an article of food and thus render the beautiful and ornamental tree on which they grow not only a delight to the eye, but a support to the frame.

The process is described by the N. Y. Tribune of Tuesday last week, as translated for that paper, as follows. "Take off the skin of the horse chesnuts and grate the nuts into a pulp and mix with the same a small quantity of the carbonate of soda to a hundred pounds of pulp—mix these well together, kneading them into paste. Then take this paste and put it in a sieve and allow a stream of clean water to run upon it stirring it well at the same time until all has passed through the sieve into a tub. The water in the tub is then allowed to settle, then it will be found that a greenish matter is contained in the solution with the water while a fine white substance has fallen to the bottom." The greenish water is then to be carefully poured off and the fine white substance retained, which is the *farina*, a fine white agreeable tasted nutriment of the horse chesnut. A second washing does no harm, only the water must be cold, as it is a starch which is very soluble in hot water, while it is moderately so in cold.

The theory of this discovery is very plain to every person acquainted with chemistry and it is a wonder that the discovery was not made before, but like a great number of other important discoveries, the theory is plain after the result has been produced. The carbonate of soda being an alkali combines with the oil in the horse chesnut and forms a soap which is more soluble in water than the starch; therefore the soap passes away in the water while the starchy nutritious part of the chesnut is left behind. The discovery is a valuable one and can be extended to the treating of acorns in the same manner. Our forefathers, the old Anglos used to live on acorns in the forests of Albyn, and man has the anatomical construction of being more a nut and meal eating animal than a carniverous one. We hold to the doctrine "that the greater variety of crops which are raised in a country, the less probability is there of a famine should a bad season, insects or storms prevail during the spring, summer, or autumn." Let us look to Ireland and her tens of thousands perishing because of the failure of the potatoe—the universal food of that land. Every farmer should raise a variety of crops, and he may be sure, that if one fail another may not. We have recommended more than once the cultivation of the chesnut. It is an excellent article of food, and when roasted with coffee beans confers upon the beverage a very fine flavor. In this discovery of Mr. Flandin, as the horse chesnut is somewhat prolific, we have the prospect at least, if the starch is but used only in the arts, to behold the nut devoted to a better purpose than merely school-boys whistles.

The Pocket Diary.

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Planing Machines.

URI EMMON'S PATENT

This is a specification of a patent granted to Uri Emmons in 1829.

The Schedule referred to in these Letters Patent, and making part of the same, containing a description in the words of the said Uri Emmons himself, of his improvement in the mode of planing floor plank, and grooving and tonguing and straightening the edges of the same, planing boards, straightening and planing square timber, &c., by machinery, at one operation, called the Cylindrical Planing Machine.

The machinery for this improvement consists, first, of a frame of wood or metal;—second, of the gear and fixtures, combined and connected together for the above named operation, the principle of which consists in running the plank, boards or timber, over, under, or at the sides of the cylinder of wood or metal, on which knives are placed, straight or spiral, with their edges exactly corresponding with each other, having from two to twelve knives or edges; also, burrs or saws similar to those used for cutting teeth in brass wheels, to groove and tongue the edges of the boards or plank as they pass through between rollers, or on a carriage, by the surface of the cylinder. The shape, form and construction of the above principle may be varied in shape and position, dimensions, &c., still the same in substance, the same principle producing the same effect. I have, by experimental operation, found that the following mode or form is the best:

1st. A frame composed of two pieces of timber, from 12 to 18 feet long, about 6 by 10 inches broad, placed about 15 inches apart, framed together with four girths, one at each end, and at equal distances from the centre, and flush with the under side; this frame is supported by posts of a proper length, framed into the under side of the above pieces of timber, and braced so as to be of sufficient strength to maintain the operative parts. There is placed a roller in the centre, of metal or hard wood, across the frame, the surface of the roller being even with the surface of the frame; directly above, and parallel with this roller, is hung the cylinder, made with two or four spiral edges or knives, 6 to 10 inches in diameter, and hung on a cast steel arbor, resting in moveable boxes attached to the sides of the frame, so as to set the cylinder up and down from the roller, to give the thickness of the timber to be planed. On each side of the cylinder is placed a pair of feeding rollers, of hard wood or metal, the under one of each pair being level with the centre one; the upper ones are hung in boxes, which are pressed down with springs or weight so that when the timber comes between them, they will hug and carry it through. These rollers are connected, and turned by wheels, at a velocity of about 12 feet surface of the roller per minute; the cylinder with two edges to make about 2,500 revolutions per minute, cutting 5000 strokes every 12 feet; this can be varied according to the number of edges, power and velocity of the different parts. The power is attached to the cylinder, by a belt running on a pulley on the outward end of the cylinder shaft; each way from the feeding rollers, is placed rollers about two feet apart for the timber to rest on while running through. On one side of the frame is fastened a straight edge, to serve as a guide, lined with metal; on the other side, rollers are placed in a piece of timber, which is pressed up to the plank or board, to keep it close to the guides or straight edge by a spring. The grooving and tonguing is done by burrs or circular cutters, similar to a saw; these burrs are hung on perpendicular spindles, the arbors of which rest in boxes attached to the inward side of the frame; a burr on one side to cut the groove, and on the other is placed two burrs, just as far apart as the thickness of the above one for cutting the groove. At or near one end of the frame, is hung a shaft with a drum or rollers, from which belts pass into pullies on each spindle of the burrs or circular cutters, which must have about the same velocity of the cylinder; these burrs are placed on one side of the cylinder opposite to each other, so as to cut the tongue to match the groove; on the other side of the cylinder is an arbor, parallel with the cylinder, on which is placed circular cutters for planing the edges of the boards or plank as they pass through; the cutter on the side, next to the guide, is stationary on the arbor, but fastened with a screw, to set it for different widths; a belt runs from a pulley on the end of the arbor outside the frame, to the said drum, as also the same from the cylinder, each having about the same motion. The feeding rollers are put in motion by a belt from a slow part of the driving power I have also put in operation, a carriage for feeding, but rollers save the time of running the carriage back.

Now what I, the said Uri Emmons, consider and claim as my improvement, and for which I solicit a Patent, is as follows, viz:

1st. The principle of planing boards and plank with a rotary motion, with knives or edges on a cylinder, placed upon the same straight or spiral, as before described, which I put in operation at Syracuse, in the County of Onondaga, in the state of New York, in the early part of the year 1824.

2d. The burrs for grooving and tonguing, in contradistinction from the mode used by William Woodworth, he using duck-bill cutters.

3d. The feeding, by running the timber through in a carriage, or between feeding rollers guided by a straight edge as before described; also the circular cutters for straightening the edges before described.

In testimony that the foregoing is a true specification of my said improvement afore described, I have hereunto set my hand and seal, the eighth day of April, in the year of our Lord one thousand eight hundred and twenty-nine. URI EMMONS.

Witnesses—Thomas Thomas, Silas Hathway.

Lighting of Factories.

Various materials have been used for the manufacture of illuminating gas as a substitute for coal; but without success when brought into competition with coal, as it is evident would be the case, when it is considered that the material from which coal gas is made really costs nothing; the coke or residum from the coal being worth as much, or more, for many uses, than the coal previous to its being carbonized. The cost of the gas to the manufacturer being for labor, fuel, &c. with the interest or the cost of works.

The process of converting coal into coke, by the abstraction of the bituminous portion is carried on extensively; the bituminous, or that portion which in coal gas works is converted into illuminating, gas being wasted.

Why then, it may be asked, have other materials been used? In the early stage of coal gas manufacture, before the art of purifying was understood, the offensive odor produced by sulphhydrate of ammonia resulting from foreign substances, always contained in a greater or less degree in coal, prevented its use in dwellings. Oil was therefore substituted, to a small extent for coal for generating gas: but its high cost, together with practical difficulties not seen at first, and which became more and more serious as the business advanced caused such works to be abandoned, and the undertakings proved ruinous to those engaged in them. The following remarks on this subject are from the Encyclopedia Britannica:—

"Oil being decomposed at a loss of nearly fifty per cent the conversion of it into gas, after a protracted but ineffectual competition with coal, has been gradually abandoned on the large scale, even in those places where from the interest of the whale fisheries, there were the strongest inducements to foster the unfounded prejudices which prevailed for some time against the use of coal gas. The exaggerated advantages which it was pretended would be derived from compressing oil gas, and thus rendering it portable, served to prolong the gross delusion on the subject. Nor were these delusions fully removed, until a demonstration was given of the failure of the scheme, in the decay of costly edifices and expensive apparatus, which, in defiance of all sober calculations, had been constructed for carrying it into effect."

"The capital expended upon oil gas establishments is actually applied to reduce to the extent of thirty per cent the intrinsic value of the raw material, which it was pretended to improve in an equal degree; add to this the loss of gas in the main pipes, which is found to be fully twenty per cent., and it follows that the light from oil gas is obtained at twice the expense at which it may be procured immediately from the oil itself."

Rosin, a much less costly material, was made a substitute for oil in the manufacture of gas and such work, though attended with a degree of success have yielded gradually to coal gas works, and we believe that all the gas works in this city will soon use nothing else but coal.

An error formerly very prevalent, and which led to the use of rosin as a substitute for coal in the manufacture of gas was, that the amount of light afforded by illuminating gas, was in direct proportion with its specific gravity.—This law was deduced by the aid of the photometer, or by observing the depth of shadows cast by flames, from gasses of different specific gravities, within short distances. It is wholly inapplicable however, when applied to general illuminations.

For example: a camphine (spirits of turpentine,) or solar lamp, in the middle of an apartment 16 or 18 feet square, will not afford throughout the apartment half the light that an argand burner consuming 4½ feet of gas per hour, in a like situation, would afford, yet if we test the two flames by the ordinary method before referred to, our conclusions would be in favor of the camphine or solar lamp.

From a series of careful experiments, made with coal gas of sp. gr. 0,450 and rosin gas of sp. gr. 0,800 it was deduced that the light giving value of the latter, compared with the former, was as 88 37-100ths to 100.

The illuminating power of coal gas varies very considerably in different establishments as it is dependant upon the quality of the coal used and the care taken in its manufacture. 100 cubic feet of gas made from the best coal requires for its combustion 170 cubic feet of oxygen. 100 cubic feet of gas from sperm oil requires 190 feet of oxygen. Assuming, with Dr. Henry, that the illuminating power is in proportion to the oxygen required, then their relative value would be as 170 to 190.

The value of rosin gas would be by this mode of comparing something less than that from oil.

If, however, we take into consideration the less offensive odor arising from coal gas and the greater whiteness of the flame, it would be perhaps nor unfair to ascribe an equal value to the same quantity from whichever material produced whether coal or rosin.

In North Carolina gas made from rosin would certainly be the cheapest, but in Pennsylvania and other States where there is bituminous coal—why not use coal for the illumination of every city and village. We may perhaps live to see the time when houses in cities will be heated as they are now illuminated, and this might well be done in connection with gas companies.

The Tomb of the Prophet Jonah.

The Nebbi Yunns (so called on account of the tomb of the Prophet Jonah, which is supposed to be within this village,) in Persia, is built on an ancient artificial mount belonging to the ruins of the far-famed Assyrian capital. The tomb of the Prophet Jonah is in a mosque of considerable size; the room where the tomb is is richly furnished with carpets and ornamented with large and beautiful Arabic inscriptions from the Koran. There are also the names of the four Khalifas (or Califs) written in the large Arabic character. There was formely a Christian monastery where the supposed tomb of Jonah now stands. The Christian tradition (of course we mean only the Christians of Mosul) is, that Jonah preached in that place, but they deny his having been buried there; they believe that when he accomplished his mission, he returned to his native country.

Curious Swearing.

In law suits between Russians and Ostyaks, it is still the custom at Beresov, to bring into court a head of a bear, and this animal which is supposed to be omniscient is there appealed to as a witness by the Ostyaks. In swearing they make the gesture of eating and call upon the bear to devour them in like manner if they do not tell the truth.

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(To be Continued.)

Peruvian Bark.

A modern traveller, alluding to the mode in which the Peruvain bark is gathered, says that in the month of May, the Indians assemble and repair to the extensive cinchona woods. One of the party climbs a high tree to obtain if possible, an uninterrupted view of the forest, and to spy out the manchas, or spots where there are groups of Peruvian bark trees.

The men who spy out the trees, are called cateadores, or searchers. It requires great experience to single out of the dark leaf-covered expanse, the cinchona groups merely by the peculiar tint of the foliage, which often differs very littie from that of the surrounding trees. As soon as the cateadore has marked out and correctly fixed upon the mancha, he descends to his companions, and leads them with wonderful precision through the almost impenetrable forest to the group. A hut is immediately built which serves as a resting place during the night and is also used for drying and preserving the bark. The tree is felled as near the root as possible, divided into pieces each from three to four feet long, and with a short curved knife, a longitudinal incision is made in the bark.

After a few days, if the pieces are found to be getting dry, the bark, already incised, is stripped of in long strips, which are placed in the hut, or in hot weather, before it, to dry. In many parts, particularly in the central and southern districts of Peru, where the moisture is very great, the bark is dried in the forest, and the strips are packed in large bundles. In other districts on the contrary, the bark is rolled up green, and sent to the neighboring villages, where it is dried. Towards the end of September the cascarilieros (bark-gatherers) return to their homes.

Typographical Blunders.

They have some funny 'errata' in the country papers, now and then—but nothing to equal the original one, which runs thus:

"ERRATA.—In our last week's paper for 'Bumbleton's Storm-destroying Porringers,' read Hamilton's Worm-destroying Lozenges."

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TO CORRESPONDENTS.

"T. B. of N. Y."—Boilers of the description you mention will cost you $100 for 1 horse power, $150 for 2 ditto, $200 for 3 ditto. If your improvement operates well we presume we could make an exchange. A 7 foot engine lathe will cost you $250. A 4 foot about the same. $1 all right.

"H. H. T. of Mass."—We can send you a new Picket Machine for $40.

"A. B. M of Miss."—We can send you the machinery you mention for the following prices :—

6 horse engine and boiler, pipes, &c	$450
Geered Lathe such as you describe	450
Drill - - - - -	50
Spoke Machine - -	125

The facings mentioned in our paper are used in foundries for the purpose of having the castings come up smooth, clean and black, instead of rough and gritty as when common sand is used. All of those named are good, though we prefer charcoal to any others. It costs about $2 per barrel here Your blower is all right if the shell is of cast iron. Being probably not set true is the reason it drives so hard. Place it at any distance you choose from the furnace, as it makes no very particular difference. For our charge see latter part of communication to A. E. L. of Ct., in last week's paper.

"A. C. B. of N. C."—Your letter expressing your satisfaction of the manner in which we closed your business with the A. G. P. Co. is received. You can suit your own convenience as to the time or manner of remitting the small balance which you acknowledge as our due. We hope the machine will please you in operation as well as it does in appearance.

"J. & P. of Conn."—We will publish the claim requested, next week.

"E. C. A. C. of Ill."—Your funds were received on Tuesday. The money last received was good. The papers had been continued as first ordered.

"T. S of N. C."—The shortest way to make butter is not the best. The cream must be kept in an airy apartment, and when churning, the cream should be about 60 degrees of heat. The cure you desire is out our line, but in other countries, the sheep are shorn of their wool at the beginning of winter, and smeared with tar and butter. The best way to mix the paints is to stir them in well boiled linseed oil, use a very little turpentine. This is the best mixture to endure. The other rule we shall give you in the paper.

"J. H. of Ohio."—If you could keep all your hives, in the inside of a large box with a double partition, filled with dry saw dust, you would keep out the damp from the combs. We see no other way to keep them from moulding, unless by dry currents of air forced in by a blower.

If "Dunse of N. Y." sends us his real name we shall publish his letter, only he must allow us to invent a new alphabet and grammar for its appearance, or does he intend it as a new literary invention. It is extremely witty and deserves a leather medal.

"H. G. Jr. of Texas."—Many thanks for that last club of 30 subscribers.

To Patent Correspondents.

"J M. of Mass."—Send on your models and then we can tell you better what can be done. Let the spring be a good one it possible.

"A Bostonian in La."—Your previous letter was duly received and the amount you sent was fully sufficient for the information you desired. To make the matter more satisfactory we sent you a letter at the time containing all the particulars. Your paper was also sent, but as you have not received them duplicates are now forwarded. From the description you gave of your invention we think it a very valuable one and know of nothing to prevent your obtaining a patent. If you apply for one the sooner it is secured the better. Your first step will be to forward to us a model of the invention and $30, which is the United States Patent Fee. There are probably other persons of the same name as yours is the reason you did not receive our letter.

"A. McK. of N. Y."—Your specification and drawings we received on Tuesday and forwarded them immediately to Washington.—The check was sufficient in amount, and we shall see that your business is not neglected. We shall write to you in a few days.

"J. A. of Pa."—We are sorry to say that you cannot Patent your plan. A Patent for the same thing was granted last year.

"J. C. of Mass."—We do not know of any one just now, who would join you. The sixty guinea article would not be wanted in this country. By putting a notice in the Scientific American you could probably find a person who would become interested with you. It will cost you $2.

"C. D. G.," "X. A. N.," and "P. & C. H."—Your Patent business is progressing and will be matured and sent to your addresses for signatures early next week.

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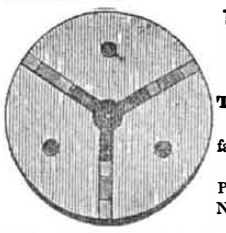

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For the Scientific American.

New Chemical Law.

No. 10.

We will continue the subject by introducing a few more examples.

	Boil. Point.	
Terchloride of Silicon,	124°	liquid.
Terbromide of Silicon,	302°	liquid.
Teriodide of Silicon.		

No compound of nitrogen with silicon nor iodine with silicon, has yet been discovered. The iodide of silicon should possess a similarity of chemical properties, also a boiling point greater than that of the bromide of silicon. The boiling points in the above example are on the increase. No specific gravities are given. The terbromide of silicon freezes at the temperature of 10°; if then the law be true, the teriodide of silicon should be a solid at that temperature, and at common temperatures. Future experiments will therefore determine the truth or falsity of these remarks. The following is an example of the substances composing this aggregated series uniting with one of the substances produced by the aggregation of the radical C H previously described.

Chloride of Methyle, Cl.H+2 CH. gas.

Bromide of Methyle, Br.H+2 CH.

Iodide of Nethyle, I.H+2 CH. specific gravity 2.237, boiling point 112°. fluid.

Here we have a case where the two series come in contact, and yet all the conditions which the law requires, are fulfilled as far as the properties are given. The bromide of methyle is probably a liquid, but if a gas, it is easily compressed into the liquid state, and should be exceedingly volatile. Its specific gravity should also be less than the iodide.—This intersection of series may be still further seen by the following examples of the same series as the last but higher in the list.

Chloride of Ethyle, Cl.H+4 C H. specific gravity .874, boiling point 52°. fluid.

Bromide of Ethyle, Br.H+4 CH. sp. grav. 1.450 fluid.

Iodide of Ethyle, I.H+4 CH. sp. grav. 1.920. boil. pt. 161°. fluid.

The specific gravities in this example are all given and how faithfully do they agree with the conditions required by the law. The boiling points of the bromide of ethyle is not given, but if it is governed by its weight of atom, it should possess a boiling point of about 102°, perhaps some higher. Future experiments upon this substance will give us its exact boiling point, and then we shall see if this be the case. The boiling points, specific gravities, &c. of the chloride, bromide and iodide of amyle, should also increase in a regular manner and possess similar chemical properties.

Perchloride of Formyle, Cl.H+2 C.Cl. specific gravity 1.480, boiling point 141° liquid

Perbromide of Formyle, Br.H+2 C.Br. spegrav. 2.100.

Periodide of Formyle, S.H+2 C.S. boiling point 280° vol. solid.

The perchloride of formyle or chloroform, as it is commonly termed, is by this law considered as chloride of methyle, with its two atoms of hydrogen belonging to the aggregated series of C.H. replaced by chlorine, bromoform and iodoform are merely the bromide and iodide of methyle with their two atoms of hydrogen in the base, replaced by either bromine or iodine: the same as the hydrogen in the chloride of methyle, is replaced by the chlorine This gives an example where an aggregated series is by substitution changed into another. In the above example the boiling point of the periodide of formyle is greater than that of the perchloride. The boiling point of the perbromide should therefore be between the two. The perchloride is a fluid whilst the periodide is a solid, which is according to the requirements of the law. The specific gravities of the perbromide and the periodide are probably greater than that of the perchloride, and that of the periodide greater than that of the perbromide, that is, there should be a regular increase of specific gravities.

Chloride of Phosphorus, Cl.3+P. liquid.

Bromide of Phosphorus, Br.3+P. liquid.

Iodide of Phosphorus, I.3+P. solid.

The specific gravities and boiling points of these substances have not yet been ascertained; they probably increase with the series. It may also be seen that the general density increases according to the requirements of the law; the first two being fluids and the last a solid.

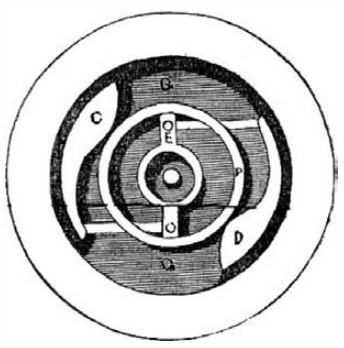
When it is asserted that a regular increase or decrease exists in the specific gravities, &c. of the chlorides, bromides and iodides of any particular substance whatever, the assertion admits of proof. Who then is there who will show a single instance of the failure of the requirements of the law. In the examination of the substances, we have proceeded upon the ground of similarity of chemical properties to the substances themselves, and have shown their probable composition or constitution, the same as if we had proceeded from the similarity of the chemical properties of the substances comprising the aggregated series of C.H. to their composition. Both cases are precisely similar. Why then are not the elements above treated of compound, and aggregated from a radical whose atomic weight is 7. S. N.

Bridgeport, Conn.

History of the Rotary Engine.

Prepared expressly for the Scientific American.

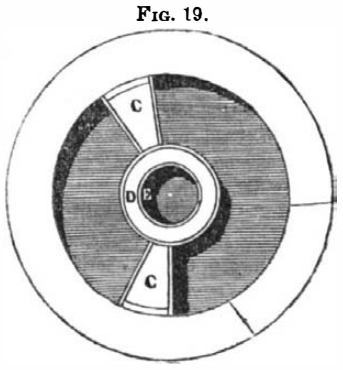
Fig. 18.



HORNBLOWER'S ROTARY ENGINE.

Mr. Jonathan Hornblower's Rotative Engine (for which a patent was secured in 1798) displays much ingenuity. The vessel in which the steam operates consists of a hollow cylinder, composed of two unequal parts, the smaller section of which is screwed off and on, for the purpose of rectifying and repairing the internal structure. These parts are cast separate, and then screwed together, firm and close, by means of flanches. They are then covered with lids turned also true, and form a figure resembling a drum. A Z are two tubes, which pass through the central openings in the lid of the drum, meeting each other at B. I H N M, are the interior limits of those tubes, on the inside of the drum, which are considerably larger than at A Z, in their diameters; the use of which is, that there shall be a proper cavity at U T, R O, to receive a packing of tow and grease, or any other materials answering the purpose, between that particular part and the end of the drum; and also the frames of the diaphragms C C, may have the firmer holding to the hollow axles or tubes at D D, leaving the parts of the diaphragm pendent at S K. The dotted lines show the interior limits of the drum, when the diaphragms are in their places; between which and the extremities of the diaphragms there is a proper rabbet to receive the packing, and between the pendent part of the diaphragms and the central hollow tube about which it revolves. This rabbet is formed by means of plates of metal, screwed on to the frame of the diaphragms, having their edges nearly in contact with the inner surface of the drum, and will be found accessible to repair or renew the packing, when the pannel which constitutes a part of the drum is removed. The parts E G, may also be repaired at the same time, by removing two screws at each end of the hollow tube. The diaphragms (which are standing in opposite directions) may therefore freely revolve the one after the other, or one may move whilst the other remains stationary. The tubes to

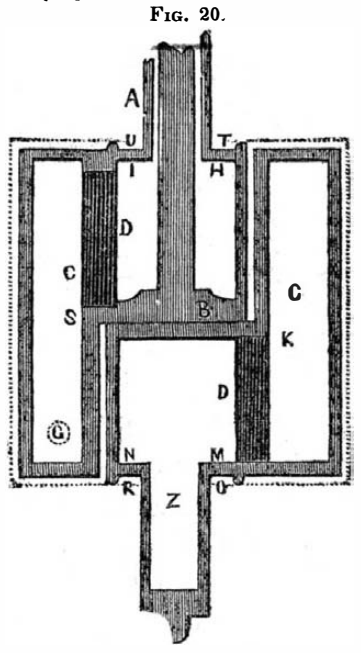
Fig. 19.



which they are attached will have their concentricity preserved by means of the solid axle within the hollow one at E, which is fixed to the end of the tube Z, and passes closely through a hole in the end of the tube A, till it reaches the extremity; where, by means of a second collar, its central position is critically maintained. The two diaphragms are hollow within, and hold communication with the cavities of their respective tubes which compose the hollow axes; and these communications are made by oblong openings where the diaphragms and tube are connected at D D.

The diaphragms are completed when these plates are screwed on; in these plates are fixed two valves G, opposite to which are two others, one in each diaphragm, so corresponding, that at the opening of one the other is closed, and vice versa. These valves are balanced and held in trunions, so that, in every station of the diaphragms, they may uniformly obey the impulse by which they are opened and shut; the manner in which that is effected is as follows:—The two diaphragms widen towards their extremities in the manner of radii, (see Fig. 2) and may therefore be brought into sufficient contact to force open the valves by means of prominences on them for the purpose.

Fig. 20.



To explain the manner in which the diaphragms are wrought upon when in their proper place, let Fig. 2 represent one end of the hollow cylinder or drum, and the central circles exhibit the hollow tubes or axles already explained The two diverging parts are the ends of the diaphragms, and are packed as before mentioned; now, these diaphragms are hollow within, and if we consider one of them to be constantly supplied with steam by means of the hollow tube to which it is connected, and the other continually holding communication with the condensing water, the consequence will be, when steam is admitted through a valve into the lesser apartment of the drum, and another valve open from the empty diaphragms into the larger apartment, that the diaphragms will recede from each other, with all the force of the steam between them; but if, by proper prevention, they can move only in one direction, it is plain that the one will remain stationary till overtaken by the other; their junction will then shift the valves into contrary positions by means of the prominent parts in them for that purpose, and the apartment, before filled with steam, instantly becoming empty, the diaphragm which was before stationary now becomes active, and the momentum of the former may, in effect, be considered as transferred to the latter. There being, therefore, in these parts of the machine a continual motion, by rapidly succeeding each other in a circular direction, their respective axles on which they turn, and which communicate motion to other machinery without the drum, are influenced in the same manner, agreeable to the main principles herein primarily set forth.

In order that the steam shall have a power of turning the diaphragms only in one direction, let Fig. 1 represent one of the lids of the drum, having the side that is faced true on the opposite direction to that exhibited in the drawing; in this is a circular channel, G G, and a projecting ring P, which serves as a perpetual fulcrum to support the two levers, C D, that occasionally revolve in the channel, and act as detents. The outer boundary of the channel also acts as a fulcrum to the extremity of the two levers at their thick ends; so that, when they are acted upon, from their connection with the axles turning them to the right hand, by means of a strong collar E, there will be no impediment to their freely revolving in the circular channel; but, when the axles strain upon the small ends of the levers in the contrary direction, they instantly become fixed so firmly between the two boundaries of the channel, as effectually to resist the whole force of the machine. To provide against the least retrograde motion whatever, when the levers may be partly worn from friction, they are furnished with springs between them and the outer extremity of the channel, so that the two bearing points may at least touch their respective fulcrums.

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